

Future-Proofing Hospitals

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Is it possible to imagine a hospital building that can accommodate a total change of function and instead of simple alteration to suit unanticipated uses?

Back in the 1920s, Edward F. Stevens, the architect reporting to the US Goldwater Report of the Committee of Hospital Planning, dreamed of ‘a plan so flexible that the medical department of today may be the surgical department of tomorrow.’ Though those ambitions were conceived in the early 20th century, they reflect one of the modern preoccupations of hospital clients and their designers.

In recent times, as a result of increasing obsolescence, we have demolished and rebuilt many of our hospitals to suit new settings and models of care delivery, to reflect changing demographics and the consequent need for expansion of some services, development of new services and/or cessation of others. The impact of new care delivery trends, the increasing availability of new technologies, endemic workforce issues (capacity and capability) and the generally aging population in developed countries results in the need for changes to physical care environments more quickly and frequently than most buildings can accommodate without the need for major refurbishment or rebuilding. Yet some hospitals have lasted longer than others.

Our example is Sydney NSW, where two venerable establishments – Westmead Hospital and the ‘Brown Building’ at Royal North Shore Hospital – opened in the same year (1978) yet the first continues to operate – albeit after undergoing many changes, additions and alterations over the years – while the second will be demolished as part of the current redevelopment on the North Sydney site.



*Article on Westmead Hospital
From Chartered Builder Vol 22, April/June 1978*



*The 'Brown Building' at Royal North Shore Hospital From:
Vanderfield, RI & Rose, G 1977, The Royal North Shore
Hospital of Sydney.*

Future proofing health buildings is increasingly important for clients and architects as is evident in any architectural magazine that includes health projects and in the claims made by project teams for most health projects. In addition, most project briefs for major health projects must now consider flexibility

and adaptability issues and project teams must develop a strategy to show how the facility will change in the future to cope with new service needs, new or replacement technology and equipment, expansion, contraction, and similar issues.

Yet do we really know what works and what doesn't? Upon reviewing this issue, it quickly became clear that the ability of a facility to adapt is rarely evaluated and even more rarely defined in a consistent manner across projects. Evaluation of flexibility and adaptability some years after completion of a project is not a well-utilised practice for health projects, particularly when it comes to evaluation that produces results for wider industry dissemination. This is likely due to the same reasons that useful post-occupancy evaluations are not often performed. The project team has moved on to new projects, and the client is engrossed with operating the facility on a daily basis until the time comes when it must be adapted to new purposes. At this point, a new team comes on board and new project drivers dictate the next project on the site with little or no thought given to sharing details regarding what made this easier and what made it more difficult.

For this research study, we looked at Westmead, Blacktown and Mount Druitt hospitals – using Prince of Wales and Royal North Shore hospitals for comparison's sake – to see what worked and what did not on those sites since each was first commissioned. Health Infrastructure NSW funded the study in 2009 and 2010 and the results have been presented at several conferences and in journal articles. The various reasons for changes were identified and assessed in terms of a matrix that was developed early in the study as it appeared to encompass most of the reasons and considerations for change. This matrix continues to be tested on further case studies as ongoing research.

Table One: Definitions of Flexibility and Associated Concepts

Focus	Managerial considerations	Functional requirement	Building system
Micro	<u>Operational</u> Easy to reconfigure, low impact on time and cost (e.g. furniture and interior spaces)	<u>Adaptability</u> Ability to adapt existing space to operational changes e.g. workplace practices	<u>Tertiary</u> 5-10 years lifespan, no structural implications e.g. furniture
	<u>Tactical</u> Involves commitment of capital expenditure; changes not easy to undo (e.g. design of operating theatres, provision of interstitial floors)	<u>Convertibility</u> Ability to convert rooms to different functions	<u>Secondary</u> 15-50 years lifespan, e.g. walls and ceilings, building services capacity
Macro	<u>Strategic</u> Substantial increase in the lifetime of the infrastructure (e.g. long term expansion plans, future conversion to other functions)	<u>Expandability</u> Ability to expand (or contract) the building envelope and increase/decrease capacity for specific hospital functions	<u>Primary</u> 50-100 years lifespan, e.g. building shell
Source	(de Neufville, et al., 2008)	(Pati, Harvey, & Cason, 2008)	(Kendall, 2005)

Of all the hospitals studied, Westmead was by far the most impressive with a truly remarkable ability to change, adapt and remain functional over time. Westmead Hospital was also highly innovative in other ways, commencing with its genesis from the Sax Report commissioned by the Whitlam Government in 1974 which recommended a new philosophy for Australian health care delivery including benchmarks for sizing hospitals and assessing service needs. Westmead was designed by a team that included the UK firm of Llewellyn-Davies Weeks, Australian architects Forrestier-Walker and Borr, and the NSW Government Architect. It drew on UK hospital planning models such as Best Buy and Harness systems and was designed using a strategy of 'indeterminancy' so that it could change in unpredictable ways to cope with different care practices and advances in technology.

Because it was expected to be completed in only four years (1974-78) Westmead was built using fast-track construction and is one of the earliest examples of this form of contract in Australia. This affected the sequence of construction and various decisions regarding detailing of the facades and floor slabs which included set downs and screeds. The hospital was designed to be modular and building services were zoned to enable easy upgrade or alteration in the future. The site continued to be developed with the establishment of the Children's Hospital at Westmead in the mid-1990s plus various other developments and upgrades over the years. In 2008, the Western Integrated Network (WIN) Strategy brought further development and additional services to the site.

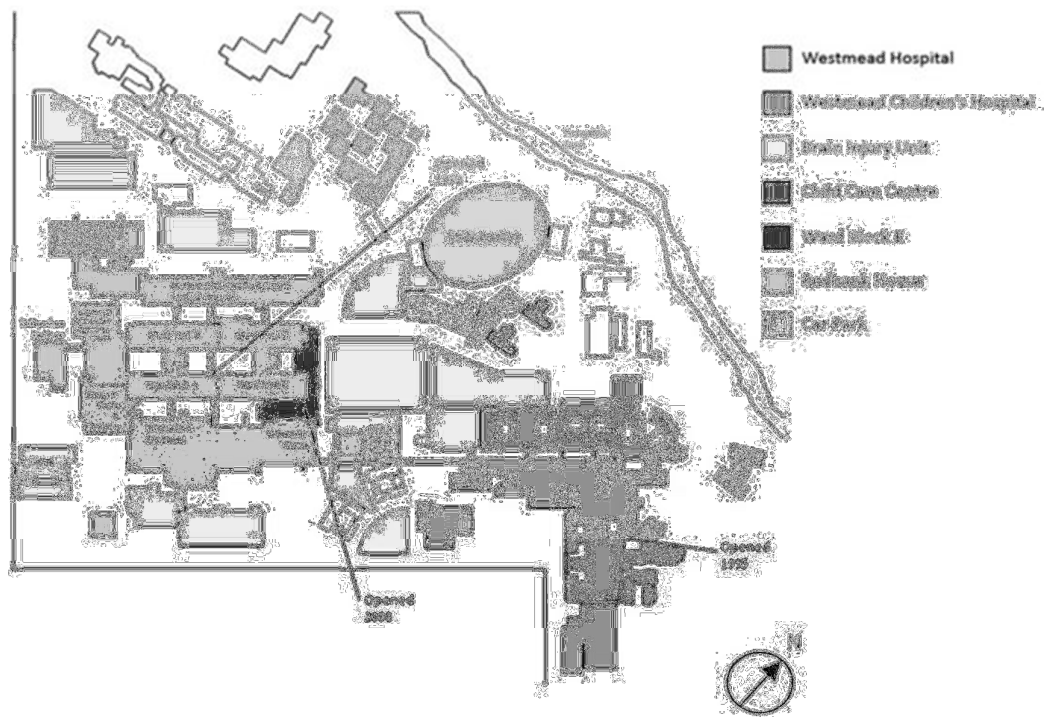


Figure: Developments on the Westmead Campus

Westmead was radical for its time, has stood the test of time and will very likely continue to be upgraded and adapted for at least another 30 years before being replaced by a new hospital on a green fields section of the site. Interestingly, the expectation was that the initial 1,000 beds would be increased. In reality, these numbers have decreased by about 200 beds since the hospital opened, with other functions expanding instead. Six-storey inpatient buildings and three-storey service blocks

were arranged around major movement routes or 'streets' designed with the capability to be extended in response to the need for future growth change. Almost every major building was designed with a free end to enable future extension or alteration in a linear fashion along the hospital 'spine'. This enabled change to occur without incurring significant capital costs or disruption to the remainder of the facility.

The overall conclusions drawn by the study as to what assists flexibility and adaptability for hospitals over the longer term include:

1. Allocating a large site with appropriate healthcare-related zoning to support a facility similar to Westmead or Blacktown. Maintaining sufficient site area for future expansion or even replacement of some or all of the existing hospital while the existing facility continues to operate is a useful metric for determining appropriate site area. The current trend towards selling excess site area should be avoided to enable this longer term perspective to be effective.
2. Designing around a hospital 'street' or spine with three to six-storey buildings along it, is a good model for future proofing. This allows expansion at either end or to various units along the spine – outward or upward. This strategy also facilitates the refurbishment or upgrade of various parts of the hospital without negatively impacting on the remaining parts in terms of noise or other disruptions.
3. Capacity to upgrade building services on a zone by zone basis should be provided. A service tunnel can also assist with this as can the double column building services arrangement used at Westmead.
4. Use of a modular grid that supports a range of functions e.g. the 7.2m x 7.2m grid used at Westmead is beneficial in reconfiguration of spaces for other purposes. A small range of room sizes (12, 16 and 32m²) that fit with standard planning grids for clinical and clinical support functions designed to fit with this grid are ultimately more flexible than many closely tailored room sizes and spaces.



Westmead c2007 – WIN strategy building under construction (Leighton Holdings)

Many issues need further investigation or discussion. For example, how do health clients work with sites in urban areas where land value is high and the push is for multi-storey buildings that are taller but feature a smaller footprint at ground level? The evidence suggests that such buildings are inherently less flexible and difficult to modify without major disruption to the remaining facility. For these reasons a tower and podium configuration will be less future proofed than the 'street' found at both Westmead and Blacktown. We look forward to further investigating these and other issues in future studies.

Source: <http://designbuildsource.com.au/learning-older-hospitals-future-proof-todays-facilities>